

Could MOOCs answer the problems of teaching AQF-required skills

in Australian tertiary programmes?

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From 2015, Australian universities will be required to demonstrate that their programmes explicitly teach and assess achievement of, knowledge and skills, and the application of both as specified by the Australian Qualifications Framework (AQF). Over the last twenty years, the sector has applied significant effort and resources to embedding the development of skills through tertiary programmes. Despite these national and institutional efforts, employer and industry concerns remain about the quality of graduate skills. The authors propose a 'massive open online course' (MOOC) approach to teaching and assessing AQF required skills. As an example, the paper identifies the skills MOOCs that would need to be developed by experts in each skill area for AQF level 9 masters by coursework programmes. The proposed MOOC would include assessment tasks and rubrics allowing students to develop and demonstrate achievement of the AQF required skills. The assessment tasks could be used by institutions to provide evidence of attainment of coursework masters standards.

Introduction: Skills, universities and employer requirements

For the past 20 years, accrediting bodies, business, industry and the Australian government have exhorted Australian universities to demonstrate that their students develop generic and transferable skills through their programmes (Business Industry and Higher Education Collaboration Council, 2007 [BIHECC]; Department of Education, Science and Training, 2002; Fraser & Thomas, 2013).

In 2011, the Australian Business Higher Education Round Table (BHERT) conducted a series of industry-

based round tables in which employers repeatedly referred to deficits in teamwork, problem-solving and communication skills, while acknowledging that these skills are essential for future leaders and the knowledge economy (BHERT, 2011). At the same time, the Business Council of Australia argued that the challenges involved in adapting to new and changing workplaces require that graduates possess effective generic skills (BCA, 2011:29). 'The ability of graduates to contribute effectively in the workplace will be increased if the knowledge they have gained is up-to-date and is complemented by good technical and generic skills' (BCA, 2011:13).

Echoing employers' concerns, the Australian Government's report 'Advancing Quality in Higher Education' also underlines the need for these skills:

5.3 That to obtain assurance that the generic skills of graduates are meeting the needs of the economy, a literature review and scoping study be undertaken to examine the practical feasibility and value of a survey of employer needs and satisfaction with graduates as part of the suite of Government endorsed performance measures (AQHE, 2012, p. 4).

Industry, employer and government concerns align with the findings of the Australian Learning and Teaching Council (ALTC) funded 'National Graduate Attributes Project'. Barrie, Hughes and Smith (2009, p. 1) reported that most Australian universities have been 'unable to achieve the sort of significant systematic changes to student learning experiences, required to achieve their stated aims of fostering graduate attributes'.

Through the last decade of the 1900s and the first decade of the 2000s, the sector has applied significant effort and resource to embedding the development of skills through tertiary programmes. The ALTC and its predecessors funded several national graduate attributes projects that have produced frameworks, principles and guides for the thorough embedding of skills, in particular at the undergraduate level (Barrie *et al.*, 2009; Oliver, 2010). Australian Universities Quality Agency (AUQA) audits have required that universities demonstrate the embedding of skills throughout their programmes. Universities have responded by mapping skills across the curriculum at both undergraduate and postgraduate levels (Barrie *et al.* 2009). Despite these national and institutional efforts over two decades, concerns remain about the quality of graduate skills.

The Tertiary Education Quality Standards Agency (TEQSA) has clearly signalled its determination to probe institutional compliance with the revised AQF descriptors and standards, as well as Discipline Threshold Learning Outcomes, requiring greater evidence of the attainment of skills, not merely mapping them. Clearly, there is a need at the sector level to mesh the AQF Standards descriptors, TEQSA Threshold Standards, and Discipline Standards, as well as industry requirements for employability skills, and to assure the attainment of the skills through the completion of tertiary programmes.

Skills are variously termed 'employability skills', 'soft skills', 'generic skills' and 'graduate attributes'. In this paper we use the term 'skills' to refer to those that the Australian Qualifications Framework (AQF) requires of Australian tertiary programmes. It is also important to note that con-

cern regarding the development of generic skills appears to be a worldwide issue (Andrews & Higson, 2008; Fain, 2012; Johnson, 2011; Sharma, 2013).

Curriculum mapping – a potentially useful tool but not the answer

Historically, the curriculum for a subject was developed by an individual discipline expert and, along with the programmes to which it contributed, was approved by the University's Academic Board. More recently, curriculum mapping became a feature of programme approval documentation (Barrie *et al.*, 2009). Curriculum mapping also has been undertaken in response to the 'Discipline Standards' in many cognate fields: for example, the University of Tasmania ALTC project to ensure minimum common Threshold Learning Standards in science (Kelder, Jones & Yates, 2012). Mapping of the curriculum specifies where broad programme objectives, including institutional graduate attributes and generic skills, are 'taught' in the curriculum. Arguably, some institutions have relied on curriculum mapping as a quality assurance measure in the development of skills. However, in spite of the use of curriculum mapping, employers continue to express concerns about the lack of skills of many graduates (BIHECC, 2007; BCA, 2011). While a potentially useful tool to analyse intended learning outcomes and curriculum content, curriculum mapping of skills is not a reliable proxy for the development and achievement of these skills, and it was never meant as such.

The development of skills in subjects relies on the knowledge and abilities of individual academic staff who must translate them into discipline contexts. There appears to be limited success in widespread change in academic learning and teaching practices, particularly in relation to the embedding of skills in the curriculum (Hacker & Dreifus, 2010). Specifically, with respect to generic skill development, the Australian research indicates that academics often lack the expertise and confidence to teach and assess such skills intentionally (Barrie *et al.*, 2009; Oliver, 2010). More recent research from the Office of Learning and Teaching funded Assessing and Assuring Graduate Learning Outcomes project reveals that often when academics develop programmes, they do not refer routinely to skills such as creativity and ethical understandings in the programme, nor do they use assessment types that might appropriately assess skills and understandings of skills (Crisp *et al.* 2012). Rather there is an over-emphasis on communication skills, especially written communication (Barrie *et al.*, 2012).

Plan B

From 2015, Australian universities will be required to demonstrate that their programmes explicitly teach, and assess achievement of, knowledge and skills and the application of both as specified by the AQF (2013) for the programme level. If, after 20 years of concerted effort, universities are still generally unable to successfully embed the development of skills into disciplinary curriculum, we argue that it is unlikely that we will be able to do so by 2015. A TEQSA imperative for demonstration of attainment will not overcome the lack of generic skills expertise that the literature suggests is a key reason why skills are not developed uniformly well across the sector (Barrie *et al.*, 2009; Oliver, 2010).

Given these contextual factors, in this paper we argue that consideration should be given to developing stand-alone, expert-developed AQF skills MOOCs that can be undertaken by students as adjuncts to their programmes, or that can be tailored by programme directors to their specific discipline field and university context. The skills MOOCs would therefore function as supplementary or complementary to specific discipline skills; those academics who are confident and 'expert' in the generic skills would utilise the resources to inform their existing programmes, others would direct students to undertake the stand-alone modules as complementary to their discipline work. While acknowledging that skills are best learnt when embedded in the context of the discipline (Hughes & Barrie, 2010), we believe that it is time to accept that this approach has had limited success in Australian universities. It is timely to develop 'Plan B'. We further argue that the advent of MOOCs may offer a solution if universities were to collaborate in developing and/or adopting MOOCs for key AQF skills, and that such MOOCs could represent an efficient and rational approach to the small 'market size' of Australia. Such an approach would obviate the need for each institution to develop its own generic skills programmes/components.

The MOOC phenomenon

In this era of increasing demand for higher education, enrolments in MOOCs demonstrate that students appreciate the opportunity to access a subject through online modules (Kolowich, 2012a). It seems clear from the popularity of MOOCs that a major attraction for students is flexible online access to 'experts' in the field. For some institutions, developing a MOOC represents 'brand visibility' and the opportunity to experiment with new technologies. For other institutions, and for educational systems, governments, and educational visionaries such as

Bill and Melinda Gates, the attractions are cost effectiveness, scalability, rationalisation in core basic subjects, open educational resources and the possibility of customisation for different contexts, as at San Jose University (Kolowich, 2013a).

The vast majority of individuals accessing MOOCs do not seek credit, as Kolowich (2012a) reports:

(in) edX's first course, a virtual lab-based electrical engineering course called Circuits & Electronics: 155,000 students registered for the course when it opened in February, but only 23,000 earned a single point on the first problem set, and 9,300 passed the midterm. When the course ended, 8,200 students took the final. Just over 7,000 earned a passing grade and the option of receiving an informal certificate from edX.

Even these low rates of completion (10-20 per cent, Kolowich 2012b) support the notion that students are willing to access online information that they need, when they need it. As many have argued (Ernst & Young, 2012), the mass 'democratisation of education' through MOOCs may signal a move to self-study and lifelong learning, among postgraduates in particular, to supplement their disciplinary studies, as boundaries between formal and non-formal institutions blur. Australian universities have already started to use online approaches to university-wide skills MOOCs for students to access when and as needed ('iwrite', University of Sydney; 'student teams' University of Queensland; and the Australian Technology Network (ATN) Learning Employment Aptitude Programme).

MOOC critics such as Legon (2013) point to the issues of assuring quality, assessment of learning, and obtaining credit for those who do complete. These issues have not been resolved in the current phase of MOOCs, and these questions are perhaps more important for students than the matter of the business model, which is raised by Kolowich (2012b) and others. We argue that the escalating rate in the use of portfolios in undergraduate and postgraduate programmes as a form of demonstration of the less tangible and generic learning outcomes of disciplinary programmes, would provide the impetus for students to complete skills MOOCs (Hallam, 2011; JISC, n.d.). The trial proposed later in this paper would demonstrate whether that belief is warranted. The issue of credit-bearing MOOCs is moot at this point, while the sector as a whole grapples with the accreditation matter. In the US, the American Council on Education has now accredited five Coursera MOOCs, and is assessing more from Udacity (Kolowich, 2013b), although accrediting these subject by subject would appear prohibitively expensive. However, it does indicate a degree of quality agency and sector acceptance.

Discussion

MOOCs and the AQF skills

The recent emergence of MOOCs offers a potential platform for the development of AQF skills at each AQF level. With a national unified system of university education, comprising national Discipline standards and AQF standards, and a national quality agency to enforce those standards, all within a declining budgetary environment, universities should surely be looking to a core curriculum of generic skills which are shared across the sector. The skills MOOCs could be developed collaboratively across the sector, and universities could customise the resources to suit their institutional contexts. This approach is currently described as a 'wrapped MOOC' (Glance, 2013). Alternatively, an organisation like Open Universities Australia could host the skills MOOCs, allowing free access to all students (this would require funding for OUA).

While research over the next few years will provide the evidence, or not, of the efficacy of MOOCs, it is timely for the Australian sector to trial at least one skills MOOC. Timing of running the MOOC could be trialled, with maximum flexibility preferred, perhaps with the MOOC running on a rolling basis three times a year, including during the traditional 'summer' break. Whether the MOOC would be offered for credit or not would sensibly be part of the trial. In all likelihood the MOOC would be a part of a life-long learning portfolio of student work. However, each institution will still need to be able to demonstrate the skills achievements of its graduates, so a for-credit MOOC would provide that evidence.

No Australian university has the sort of funding that has been devoted to Coursera, Udacity, Futurelearn and edX MOOCs, although several Australian universities have joined with Coursera to produce individual units. The University of Queensland's Vice-Chancellor suggests that production of a quality MOOC is 'upwards of \$100,000' (Hare, 2013), suggesting that a national collaborative approach to skills MOOCs is rational economically. To date, there is no indication that prestigious international universities will develop skills MOOCs and if they do, they certainly would not be developed within the AQF context. The MOOC platform offers a possible 'solution' to the issue of assuring that generic skills are included amongst the learning outcomes of Australian postgraduate programmes.

AQF level 9 coursework masters skills

For the purposes of illustrating the development of AQF skills through MOOCs, we have chosen to work with

AQF level 9 for coursework masters programmes. We have chosen this AQF level for two reasons: 1) almost 25 per cent of Australian higher education students are enrolled in a postgraduate coursework degree (Edwards, 2011); and 2) the demonstrable development of AQF skills through postgraduate coursework programmes remains a significant problem, particularly since most graduate attribute projects have focussed understandably on the undergraduate level. (Barrie *et al.* 2012).

Table 1 illustrates our mapping of skill MOOCs. We also include MOOCs on Indigenous awareness (Universities Australia, n.d.) and inter-cultural awareness. We include inter-cultural awareness, as postgraduate students, especially those undertaking a level 9 qualification, may not have benefitted from previous studies designed to develop graduates for a globalised world.

The development of the AQF skills MOOCs

The development of sector level AQF skills MOOCs would incorporate an online instructional design approach that maximises the potential of open digital technologies to:

- Allow independent study and application by students.
- Provide authentic assessment tasks for AQF 9 skill learning outcomes.
- Provide samples of student assessment tasks at Level 9 to assist markers to assure standards across institutions.
- Allow programme directors to customise and embed the MOOCs into their programmes.

A sector level approach to develop the AQF skills MOOC for level 9 coursework masters students could include:

- The identification and agreement of experts in each of the skills areas to develop the MOOCs.
- The determination of the length of student study/engagement time for each MOOC (e.g. 10 – 20 hours).
- The development of a contemporary, student-centred framework for the MOOCs based on current research into mature age student learning and online learning.
- The development and trialling of one 'pilot' AQF skills MOOC.
- The development of student learning activities that assist students to develop and apply the skill.
- The development of assessment tasks and marking rubrics to assess the achievement of skill learning outcomes.
- The development of resources, in a variety of contemporary digital media, and references.
- The development of guidelines for programme directors to assist them to customise and embed each MOOC into their programme.

Table 1: Mapping Coursework Master's AQF Skill Requirements and MOOCs

<i>AQF skill specification</i>	<i>MOOC</i>
Cognitive skills to demonstrate mastery of theoretical knowledge and to reflect critically on theory and professional practice or scholarship	(1) Academic literacy (2) Critical reflection
Cognitive, technical and creative skills to investigate, analyse and synthesise complex information, problems, concepts and theories and to apply established theories to different bodies of knowledge or practice	(3) Inquiry and problem solving in technical contexts
Cognitive, technical and creative skills to generate and evaluate complex ideas and concepts at an abstract level	(4) Creative thinking (5) Critical thinking (6) Numeracy
Communication and technical research skills to justify and interpret theoretical propositions, methodologies, conclusions and professional decisions to specialist and non-specialist audiences	(7) Written and oral communication (8) Digital communication
Technical and communication skills to design, evaluate, implement, analyse and theorise about developments that contribute to professional practice or scholarship	(9) Professional and ethical practice (10) Collaboration and teamwork
	(11) Indigenous awareness
	(12) Inter-cultural awareness

- The development and review of the MOOCs by expert panels.
- The trialling and evaluation of all 12 AQF skills MOOCs with students and programme directors.

The selection of the experts who develop the MOOCs would be potentially contentious. However, an Office of Learning and Teaching convened committee, similar to the Discipline Standards Committees, could draw on expertise across the sector, perhaps using their existing tender processes.

The model and its value

A MOOC approach for Level 9 programme skills would provide a model for other AQF levels, but perhaps more importantly, a suite of resources that would allow institutions to embed self-study and application of AQF skills

relatively quickly into their masters programmes.

The value of this approach is multifaceted. In a cash-strapped sector, significant potential savings in duplicated effort and resource development could be made across the country. Students could access the AQF skills MOOCs as and when they need 'just in time and just for me'. The development of the skills MOOCs would strengthen coursework masters programmes so that they explicitly develop the requisite Level 9 AQF skills essential for professional practice and/or scholarship, while making explicit to students the various skills that they have developed. The use of the OUA platform, at least initially, would enable wide access by masters students: as a Moodle user, OUA shares an open source LMS with the majority of Australian universities, and one which espouses the philosophy of open education.

Conclusion

This paper has reviewed the continuing problem of explicit teaching and achievement of employability skills through our tertiary education programmes. We speculate that the recent emergence of the MOOC phenomenon may provide a solution to this perennial problem. By utilising skills experts to develop, model and facilitate the embedding of skills into programmes, or as stand-alone MOOCs for inclusion in portfolios of student work, the sector may be able to finally address the serious concerns of business, government and industry regarding graduate employability skills. We suggest that it is timely for the sector to trial the development and impact of a skills MOOC, in the first instance developed for postgraduate students. Given the apparent lack of expertise that many Australian academics have in the area, we suggest that this first MOOC target the development of creativity skills.

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